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EXAMINER

NGUYEN, THUONG

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/749,959	Applicant(s) MOHAMED ET AL.	
	Examiner Thuong (Tina) T. Nguyen	Art Unit 2455	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/2/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is responsive to the amendment filed on 6/24/08. Claims 1, 4-8, 11, & 23 were amended. Claim 2 is canceled. Claims 1, 3-23 are pending and represent system, method and computer readable for lightweight input/output protocol.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 5-16, 18 and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pandya, Patent No. 2004/0010612 A1 in view of Henninger, Patent No. 5,499,371.

Pandya teaches the invention substantially as claimed including high performance IP processor using RDMA (see abstract).

4. As to claim 1, Pandya teaches a system for offloading an input/output (I/O) task comprising:

a client running on the first computer ([0091] and Fig. 7 - client on the left);

a server running on the second computer ([0091] and Fig. 7 - server on the right);

and

at least one remote direct memory access (RDMA) channel linking the first computer and the second computer ([0068] and Fig. 35 - client/server RDMA transfer), wherein the first computer and the second computer communicate in accordance with a protocol comprising a network discovery phase ([0100] - discovery) and an I/O processing phase ([0072] -I/O processing), wherein read operations are implemented using RDMA ([0140]).

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But Pandya failed to teach the claim limitation wherein write operations are implemented using send operations, wherein the write operations are not implemented using RDMA.

However, Henninger teaches method and apparatus for automatic generation of object oriented code for mapping relational data to objects (see abstract). Henninger teaches the limitation wherein write operations are implemented using send operations, wherein the write operations are not implemented using RDMA (col 10, lines 33-45; col 11, lines 55-60; col 12, lines 3-5 & 15-17).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Pandya in view of Henninger so that the system would be able to retrieve query command from the database for a particular object instance. One would be motivated to do so to map information between a database and an object-oriented application.

5. As to claim 3, Pandya and Henninger teach the system of claim 1 wherein the protocol is used in association with a second network protocol ([0008]).

6. As to claim 5, Pandya and Henninger teach the system of claim 3 wherein the second protocol is a common internet file system (CIFS) ([0008]).

7. As to claim 7, Pandya teaches a method comprising:

discovering, by a client on the first computer and a server on the second computer ([0100] - discovery), at least one shared remote direct memory access (RDMA)-capable provider ([0068] and Fig. 35 - client/server RDMA transfer); and
posting, by the client, an I/O processing request for completion by the server on the second computer ([0072] - I/O processing), wherein read operations are implemented using RDMA ([0140]).

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But Pandya failed to teach the claim limitation wherein write operations are implemented using send operations, wherein the write operations are not implemented using RDMA.

However, Henninger teaches the limitation wherein write operations are implemented using send operations, wherein the write operations are not implemented using RDMA (col 10, lines 33-45; col 11, lines 55-60; col 12, lines 3-5 & 15-17).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Pandya in view of Henninger so that the system would be able to retrieve query command from the database for a particular object instance. One would be motivated to do so to map information between a database and an object-oriented application.

8. As to claim 8, Pandya and Henninger teach the method of claim 7 wherein the discovering at least one shared RDMA-capable provider, further comprises:

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Art Unit: 2455

obtaining, by the client, a server request resume key from the server ([0120]);

opening, by the client, a pipe to the server ([0124] - pipes);

sending, by the client over the pipe, a negotiate request ([0105]); and

sending, by the server over the pipe, a negotiate response including a minimal list of common providers ([0105]).

9. As to claim 9, Pandya and Henninger teach the method of claim 7, further comprising:

creating, by the client, an RDMA connection to the server over a shared RDMA-capable provider ([0105]); and

authenticating, by the client and the server, the RDMA connection ([0115]).

10. As to claim 10, Pandya and Henninger teach the method of claim 9, further comprising: registering, by the client, one or more files for use with the server over the RDMA connection ([0098]).

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11. As to claim 11, Pandya and Henninger teach the method of claim 10 wherein the registering at least one files comprises:

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sending, by the client to the server, a register file message ([0098]); and

sending, by the server to the client, a register file completion message ([0098]).

12. As to claim 12, Pandya and Henninger teach the method of claim 9 wherein the authenticating the RDMA connection further comprises:

sending, by the client, an authenticate request message to the server, the authenticate request message including a key ([0127]);

if the key matches a previous key sent by the server to the client, sending, by the server, an authenticate response message to the client ([0127]).

13. As to claim 13, Pandya and Henninger teach the method of claim 12 wherein the previous key is a key contained in a negotiate response message sent by the server to the client ([0127]).

14. As to claim 14, Pandya and Henninger teach the method of claim 12, further comprising: sending, by the server to the client, a status response message to complete the authenticating ([0127]).

15. As to claim 15, Pandya and Henninger teach the method of claim 7 wherein the posting the I/O processing request comprises sending, by the client, one of (a) a close request, (b) a cancel request, (c) a read request, (d) a 5 write request, (e) a vectored read request and (f) a vectored write request ([0140]).

16. As to claim 16, Pandya and Henninger teach the method of claim 15, further comprising:

completing, by the server, the read request and the vectored read request by sending data using RDMA write operations ([0165]); and

completing, by the server, the write request and the vectored write request by sending data using normal send operations ([0165]).

17. As to claim 18, Pandya and Henninger teach the method of claim 7 wherein posting the I/O processing request further includes indicating whether the completion by the server should be in polling mode ([0115]).

Art Unit: 2455

18. As to claim 20, Pandya and Henninger teach the method of claim 18, further comprising: if the client indicates that the completion should not be in polling mode, completing, by the server, the I/O processing request by sending a status block to the first computer by way of RDMA transfer ([0100]).

19. As to claim 21, Pandya and Henninger teach the method of claim 18, further comprising: if the client indicates that the completion should be in polling mode, and the client has sent an interrupt request message to the server, sending, by the server to the client, an interrupt response message by way of an ordinary send ([0112]).

20. As to claim 22, Pandya and Henninger teach the method of claim 7 wherein posting the I/O processing request further includes specifying a number of credits in a header of the request ([0124]).

21. As to claim 23, Pandya teaches a computer-readable media comprising:

discovering, by a client on the first computer and a server on the second

computer ([0100] - discovery), at least one shared remote direct memory access (RDMA)-capable provider, wherein the first computer requests a server request resume key and the second computer passes the server request resume key as an authentication mechanism, wherein after authentication, the first computer opens a pipe to the second computer and queries the second computer for a list of shared RDMA-capable providers (figure 18 & 28; [0115], [0127]); and

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posting, by the client, an I/O processing request for completion by the server on the second computer ([0112] - storage offload), wherein read operations are implemented using RDMA ([0140]).

But Pandya failed to teach the claim limitation wherein write operations are implemented using send operations, wherein the write operations are not implemented using RDMA.

However, Henninger teaches the limitation wherein write operations are implemented using send operations, wherein the write operations are not implemented using RDMA (col 10, lines 33-45; col 11, lines 55-60; col 12, lines 3-5 & 15-17).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Pandya in view of Henninger so that the system would be able to retrieve query command from the database for a particular object instance. One would be motivated to do so to map information between a database and an object-oriented application.

22. Claim 6 disclose a computer readable claim and do not teach or define any new limitations above claim 4 and therefore are rejected for similar reasons.

23. Claims 4, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pandya, Patent No. 2004/0010612 A1 in view of Henninger, Patent No. 5,499,371 and further in view of Considine, Patent No. 2004/0117438 A1.

Pandya teaches the invention substantially as claimed including high performance IP processor using RDMA (see abstract).

24. As to claim 4, Pandya and Henninger teach the system as recited in claim 3.

Pandya and Henninger failed to teach the claim limitation wherein the second protocol is a server message block (SMB).

However, Considine teaches switching system (see abstract). Considine teaches the limitation wherein the second protocol is a server message block (SMB) ([0085]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Pandya in view of Considine so that the system would be able to ensure the TCP connection. One would be motivated to do so to simplify and improved the system.

25. As to claim 17, Pandya and Henninger teach the method as recited in claim 15.

But Pandya and Henninger failed to teach the claim limitation wherein the vectored write request includes a collapse flag in a header of the request.

However, Considine teaches the limitation wherein the data flow is denoted via implementation of various flags ([0528]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Pandya in view of Considine so that the system would be able to enhance the flexibility and compatibility of the system. One would be motivated to do so to simplified and improve the system.

Art Unit: 2455

26. As to claim 19, Pandya and Henninger teach the method as recited in claim 18.

But Pandya and Henninger failed to teach the claim limitation wherein the indicating whether the completion should be in polling mode comprises indicating that the completion should not be in polling mode by setting an interrupt flag in a header of the I/O processing request.

However, Considine teaches the limitation wherein the indicating whether the completion should be in polling mode comprises indicating that the completion should not be in polling mode by setting an interrupt flag in a header of the I/O processing request ([0528]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Pandya in view of Considine so that setting a flag in a header. One would be motivated to do so to simplify and improved the system.

Response to Arguments

Applicant's arguments with respect to claims 1, 6, 7 & 23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tina Nguyen whose telephone number is 571-272-3864, and the fax number is 571-273-3864. The examiner can normally be reached on 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Saleh Najjar can be reached on 571-272-4006. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2455

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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